Aussies Sustaining Australia

Showcasing Sustainable Developments
Leading the Change

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1 ACKNOWLEDGEMENTS

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The National Australian Built Environment Rating System energy and water usage benchmarking data was kindly provided by the NSW Department of Energy Utilities and Sustainability.

The data used for estimating mains versus total water for existing and typical new development was based on water consumption breakdown data within houses, compiled for BASIX, and supplied by the NSW Department of Planning.

2 EXECUTIVE SUMMARY

This paper showcases a variety of sustainable developments in Australia and compares them to current practice. We seek to answer the following questions:

1. What do ordinary people know about sustainable projects? What do they say is 'sustainable'? What do they say governments need to do to make sustainable development easier so any Australian can easily live and work sustainably?

   Ordinary people are more advanced than government policies in applying sustainability to their homes and developments. Governments must stop red tape and inappropriate levies and start financial assistance.

2. How far have these people gone, and how far do their projects fall short in sustaining Australia?

   Many people have rainwater tanks and solar power systems, but some go further and grow their own food on site and are completely disconnected from mains supplies.

3. Who is going sustainable in Australia, and who isn't? What is driving people to go sustainable, and what is stopping them?

   Only very few have the required level of commitment and means to go sustainable on their own. Most sustainable developments are setting examples for others to follow.

4. What are the costs? Is it true that sustainable projects always cost more, or too much?

   Sustainable projects tend to cost more and on top of this, governments are levying sustainable developers the same as unsustainable developers.

5. How much water, energy, transport, food and land do sustainable projects use compared to typical development?

   If all new homes were built sustainably, we would need no more new power stations, dams or desalination plants. Huge savings in other areas are possible, but none of these things are taken into account in current government planning and regulatory systems.

6. What is the red tape? Which states do things well, and which don't?

   Too many barriers are hindering sustainable projects and no government has yet enabled sustainable development.

The need for sustainability is becoming increasingly apparent: climate change, pollution, diminishing resource supplies. Sustainable houses and offices at the moment provide some relief and although important, will not halt the increasing demand for scarce water, power and food resources. We need sustainable subdivisions and lifestyles.

Improving sustainable house and office designs is important and our start on collecting important data will continue to provide valuable input to future designs.

We need real incentives for sustainable development:

1. A grant system to reduce the installation costs of sustainable technologies;
2. Reduced taxes at all levels of government for sustainable development to offset unfair increased costs of the sustainable development;
3. Fast track the development applications for sustainable developments;
4. Phase out property taxes that increase the incidence of unsustainable development practices;
5. Increase the permissible floor space for sustainable development; and
6. Funding for monitoring of the environmental benefits of sustainable developments

Importantly, the government obstacles to sustainable development need to be removed. This will place a cap on present water demand, and dramatically reduce pressure on energy demand.

Then we need to address the major issue of the existing development and its impacts on sustainability. We need to seriously address demand minimisation in conjunction with improving the sustainability of methods of supply. For water, we need to work towards returning our treated effluent to water supply dams instead of the wasteful discharge to creeks and rivers. For power, everyone should contribute to generating their own power needs.

3 WHY RESEARCH SUSTAINABLE DEVELOPMENT?

In little over 200 years, Australia has become one of the least sustainable nations in the world. Even amongst developed countries we rank highly in terms of resource consumption and waste production. Our ecological footprint was 7.7 hectares per person in 2001, fourth highest in the world (*WWF, 2005*).

Australia, with the rest of the world, is in an environmental crisis called Global Warming. Our rain is falling differently and much rain no longer falls. Our days are hotter and nights are colder. The weather is unusual and getting more so. Much of this year's Australian grain crop has failed. Food prices are rising and staying higher than petrol prices. If more of us lived on the land or depended on water for our livelihood, and if we had more first hand experiences of how difficult it's become to grow food, or to be cool without air conditioning, then perhaps we might see the urgency more clearly. But we don't. So Aussies Sustaining Australia are delighted you will share this report and the facts. By reading and acting on this report you will make a difference.

Without the facts we can't make decisions, we can't govern ourselves, and we can't hope. Without data that is honest, robust and which asks the questions intended to provide answers most likely to sustain our environment it is, we believe, impossible to conserve our scarce resources.

We conducted research across Australia to show what ordinary Australians are doing to sustain Australia, in their homes and workplaces. We want governments, our communities and our colleagues to know the facts, to be open about the problems and to support sustainable development that will conserve our resources.

Our research gives alarming proof that the red tape, policies and impacts of most development, even for sustainable development, is failing to sustain our scarce resources. We offer solutions which we think are practical, attractive to developers, homeowners and tenants, and which governments and our communities can afford.

Three universities have agreed with Aussies Sustaining Australia about the crisis we face and the need for more research. They have agreed to take over the research undertaken for this report. We expect the research will be helpful to the media, governments and communities and will change the way we use land, water and energy.

4 WHAT DO THE CASE STUDIES TEACH US?

The case studies described **Appendix A** have provided information on the experience of developing sustainably in the current administrative and legal framework. Following are improvements we ask governments, regulators and industry bodies to make to these systems. Sustainable developers and the wider community recognise that things need to be done differently. It's the current red tape and development control system and government policy frameworks which makes Australia unsustainable. Research (*Troy and Randolph, 2006*) into public attitudes indicates that people generally believe that:

- The government does not take conservation seriously, even though it is very important;
- Householders are currently penalised for having a water tank; and
- There needs to be considerable financial support from the government and utilities.

The 'utilities' are government businesses, however, whose profitability will or may fall if the community are not penalised for having a rainwater tank, or if they make most of their energy freely from the sun. Without those profits paid to them as dividend the governments will lose or have their revenue reduced. So in asking for these changes we are asking governments to run their own businesses differently, to allow competition from the community.

4.1 HOW CAN WE AUSTRALIANS BE MORE SUSTAINABLE?

Sustainable projects in Australia are those which:

- cause lowest climate change;
- will grow over 25% of food on site or nearby where people live (in the street with productive, edible landscapes replacing or adding to native decorative trees);
- have the lowest living costs for energy and water – a household of up to four people should expect to pay less than $300 a year for water and energy;
- are more profitable for a developer and more profitable for people who buy there;
- conserve water and energy; and
- change the way we live and use energy and water in Australia; but
- can be done by anyone no matter what their interest is in environmental issues.

4.2 WHAT IS A SUSTAINABLE HOUSE?

A sustainable house is an ordinary house that is lived in like any other house, but it:

- harvests rainwater;
- treats sewage;
- generates its own power;

- uses resources and materials that are renewable and/recyclable;
- avoids the use of toxic chemicals and poisonous substances;
- offers improved security of supply for water, energy and food;
- is safe;
- is adaptable to an owner or tenant as they mature or their business changes; and
- is affordable.

There are many examples of sustainable houses listed in this report and they are ordinary houses able to be lived in by anyone.

What is it like to live in a Sustainable House?

"Life is much the same as it was before we renovated the kitchen and bathroom to make them bigger. The only difference is when the sun shines we make our electricity, and when it rains we make our water. We have 240 volt appliances: fridge, dishwasher, clothes dryer, computers, video games, lights, etc, and we have mains grid quality electricity." Michael Mobbs, Sydney's Sustainable House: www.sustainablehouse.com.au

Is rain water safe to drink?

Over 3 million Australians drink water from rain tanks every day. Data from fortnightly monitoring over 18 months at Sydney's Sustainable House showed that the water was safe to drink. This data has been published in the 1998 book Sustainable House, published by Choice Books: www.choice.com.au/viewProduct.aspx?sku=SUSH

Is onsite sewage treatment a good idea?

About 25% of houses in the United States, serving over 65 million Americans, have onsite waste treatment. Over 37% of new housing in the US is using onsite waste treatment systems in preference to "big pipes" from centralised sewerage systems. There are two main reasons for this. For over 20 years very robust, affordable systems have convinced developers and house holders that the systems are workable and cheaper. In addition, the US EPA in a report to Congress, having reviewed the systems across America, began a positive program for management, monitoring and raising standards generally. The same increase in onsite waste treatment is taking place in New Zealand (which generally has clay soils and so has greater environmental difficulties compared to many Australian soils). The evidence is out there - the choice is available to anyone, but the red tape in Australia usually makes it too difficult, too expensive or unlawful.

4.3 HOW ARE SUSTAINABLE DEVELOPMENTS PERFORMING?

This research project was commissioned because no-one in Australian governments is asking or seeking to answer this question.

Although there have been a fair number of sustainable developments, they are few. No government is collecting data on the number and types of sustainable projects. We estimate several thousand have been built in the last ten years across Australia, mostly in the country. The opportunities to gather data by monitoring the numbers through the local government approvals

processes have not been used. Monitoring, including such detailed information as metering of electricity and water consumption, should be a condition of development approval. But the cost of monitoring should not be a burden on the affordability of sustainable houses.

Australian government 'sustainability rating tools' do not reduce the major impacts development has on climate change. State governments use these tools to control shower heads, insulation, rainwater tanks, and house design; examples are BASIX in NSW, First Rate in Victoria.

But sustainable communities cannot be achieved by building "green" houses. A rainwater tank, an on site sewage system and solar panels for a house do not achieve sustainable households, nor do they create a sustainable subdivision, city or town.

Water and energy efficient houses achieve less than a third of the "essentials" required to produce a sustainable subdivision or urban environment. Most water and energy is used to grow and transport food. Thus, if a house was to do no more than grow all its own food it would save more pollution and use less water than if it were self sufficient for water and energy from on site systems. Consider the use of energy at new subdivisions planned for Australian cities and being built now; the energy will not be used just in the building and use of the houses. In Australia, carbon dioxide emissions from our day to day lives are split roughly three ways between our homes, transport, and growing and transporting our food. Therefore, a development cannot be sustainable unless travel, food buying and waste are addressed in the design of the systems for the subdivision.

These "lifestyle" aspects of sustainability cannot be put into the buildings at these subdivisions. How the residents travel, deal with their waste and buy their food are individual choices. Thus, by itself, a house design is not a solution to the pollution and demands for natural resources of modern Australian life. If, along with a sustainable house, there is productive food growing land that the householders have access to on foot, or if they choose not to use cars to shop and can elect to go for a walk, or if they can choose to play with their children on the site, and meet these social needs from the "systems" designed into the subdivision, then the subdivision design may be characterized as "sustainable", or approaching that state.

4.4 WHAT ARE THE OBSTACLES TO SUSTAINABLE DEVELOPMENT?

The systems in place for approving new developments and allocating infrastructure are proving inadequate in accounting for the reduced environmental impacts of sustainable developments. These systems do not have the flexibility to assess each project on its merits.

The assessment of new developments in terms of their energy and water consumption relies on calculations which do not adequately take into account sustainable practices. For example, Energy Australia may exercise its power under the Energy Supply Act to force a new development to install a new substation at a developer's cost to serve a wider area, even when no net increase in the electricity is to be supplied to the developer's site. That law directly supports and promotes a failure by government to manage electricity demand by others within the wider area.

The allocation of monetary contributions made by developers is not legally required to be carried out on a sustainable basis. Contributions of sustainable developments currently may be used for unsustainable purposes, due to the inability for those contributions to be re-allocated to other

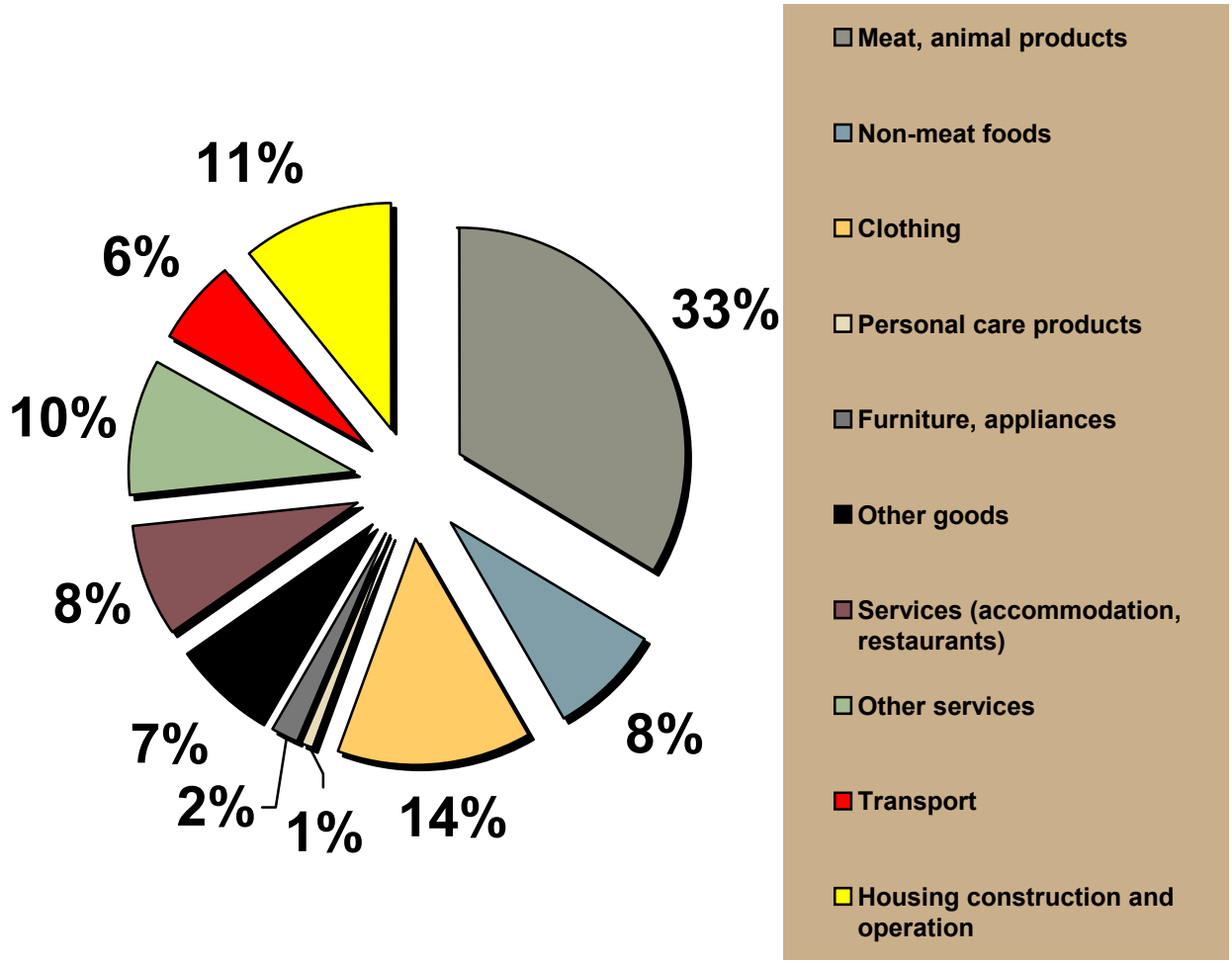
agencies. For example, a sustainable development may be required to pay for car parking spaces, but has no opportunity to use those funds to support sustainable transport options. A more appropriate system would allow those funds to be used, for example, to subsidise public transport use or operate a car sharing scheme.

The key obstacles to stopping climate change are:

- Irrelevant red tape – rules that don't stop climate change and focus on the wrong things;
- Wrong red tape – rules that stop, slow or make sustainable development too expensive;
- Ministers, councils, architects, designers, engineers, builders, valuers, real estate agents, lenders who fear sustainable projects and know little about them.

The result of poor rules and a lack of understanding is that most government, investment and planning decisions are to approve unsustainable development first and sustainable development last.

Why are Our Systems Failing Us?



Source: www.acfonline.org.au/default.asp?section_id=86&c=31817

Over 40% of the human ecological footprint in Australia is for the production, transport and consumption of food. Only about 11% of the footprint is for housing and construction.

Land and development controls which seek to achieve sustainable resource use focus mostly on housing and construction, and mostly ignore or pay little attention to food. BASIX, First Rate, etc give no credit points for food production. Governments use, design and manage roads (roughly 23% of the land surface of our cities) without promoting the growing of food there. Our cities have almost lost their former productive edible landscapes. As these sustainability measuring tools only measure about 11% of the problem, and ignore over 40% of the problem they are fundamentally incapable of sustaining Australia. It is not architects, engineers, interior designers, planners or shower head makers who can sustain Australians; it's those ordinary Australians, local gardeners, or those who garden for others, who can sustain Australia. That is, Australian planning rules are presently misdirected and strategically irrelevant to the production of food. In fact, the rules are being used to reduce the amount of productive agricultural land closest to where most Australians live. The rules need to reward, require, promote and fast track developments which put roof gardens, productive landscapes and food where the development is located or nearby.

4.5 WHAT ARE THE INCENTIVES FOR SUSTAINABLE DEVELOPMENT?

At present there are few economic incentives for property developers to carry out sustainable development practices. In pure economic terms, the cost of installing water and energy saving technology and carrying out sustainable building practices is still more expensive than carrying out a conventional development that does not involve a focus on sustainability.

In the current environment, water and energy costs are relatively inexpensive and therefore any savings that can be achieved by utilising the sustainable technology does not pay for the capital outlay required in order to install the sustainable technology.

The key problem in the current market is that there is little demand for sustainable development. Tenants are generally unwilling to pay higher rentals for sustainable office buildings compared to unsustainable buildings; house and unit owners are not willing to pay a premium in order to own a sustainable house or unit. In short, sustainable developments are a classic example of a market failure.

A practical example of this are the increased construction costs for the commercial development at 376-382 New South Head Road, Double Bay that will be substantially completed in December 2006.

The project is a low rise mixed use commercial and retail development in the heart of the Double Bay town centre. The development amounts to just under 2000 square metres of gross floor area and the development will achieve an equivalent to a 5-star Greenstar rating. In short, the development has no on-site car parking, recycles sewage on site, utilises rainwater for potable water uses, minimises energy consumption through the use of passive solar design, has openable windows to reduce air conditioning utilisation, has installed a relatively energy efficient air conditioning system and uses appropriate low-wattage light fittings.

The construction costs of the project will be approximately $5,000,000 on completion. The direct cost to the project for the inclusion of sustainable technologies has been estimated by Bruce Davies from BDA Consultants to be in the order of $700,000. The net cost to the project of making it a sustainable development after water and energy savings are capitalised is estimated by the developer to reduce these costs by approximately $200,000 therefore resulting in the net cost to the project of $500,000. By any measure, the sustainable technology at a cost of 10% of the construction costs is an expensive inclusion, especially given that there is little (if any) demand for sustainable office and retail space at the smaller end of the commercial market.

The incentives for property developers to carry out sustainable development are as follows:

1. The business may have a sense of social responsibility which encourages them to carry out sustainable development practices notwithstanding the drop in profitability;
2. As sustainable projects are relatively novel, there are considerable public relations benefits to be achieved for the property developer;
3. The inclusion of sustainable technology and sustainable building practices may improve the prospects of receiving an approval for an otherwise controversial development application; and
4. Government and semi-government tenants sometimes insist on minimum environmental standards in office space they lease.

Points 1 and 2, whilst legitimate are not enough to convince a significant proportion of the property development profession to carry out sustainable development, especially considering the significant costs involved.

Point 3 is a clear economic benefit in favour of carrying out sustainable development, however, it is significantly cheaper for a developer to improve their prospects of success in obtaining development consent by lodging an appeal with the Land and Environment Court rather than go to the time, expense and trouble of carrying out a sustainable development.

Point 4 is an important issue for property owners (predominantly listed property trusts) who wish to attract government tenants to their commercial office buildings.

Government incentive schemes to improve sustainability of development are generally limited to rebates for rainwater tanks, solar hot water systems, water saving devices and water efficient appliances. The rebates are small compared to the costs paid by the householder, and barely match installation costs. As the price of water is so low and fixed charges so high – for most Australian households fixed charges make up the bulk of their water bill – householders usually don't expect to get their money back.

The Sydney Water Corporation (SWC) is developing a scheme to allow low cost, affordable methods of disconnection from town water and sewerage. This will have a number of benefits for SWC, including:

- reduce pressure on existing infrastructure (*dams, treatment plants and networks*);
- reduce treated sewage discharges to natural watercourses; and

- lower operating costs.

Importantly, it will reward property owners who seek to be self sufficient for water and reuse their sewage. They win this reward because they will be exempt from fixed charges. This dramatically reduces the payback time for sustainable products to about 4 or 5 years compared to the usual 15 or more years were they still to pay fixed charges.

The initiative is expected to be finalised soon. At the time of publication, SWC had yet to decide its fees but they were envisioned to be zero for water. Plumbing costs to the land owner are expected to be less than $150 due to the simplicity of the plumbing methods agreed to.

By this action SWC will overcome the failure of the NSW water pricing regulator (the "Independent Pricing and Regulatory Tribunal") to achieve a fair pricing structure for households which choose to be self sufficient for water and sewage.

The current incentives are not substantial or even financially positive!

4.6 FINANCES AND ECONOMICS OF SUSTAINABLE DEVELOPMENT

The capital costs of sustainable water and energy systems may cost more than standard practice systems, but these costs are offset by a reduction in operational costs. Furthermore, as the costs of purchasing water and energy from suppliers rise, and the capital costs decrease with advances in technology, these sustainable systems will become even more financially attractive.

Most importantly, the capital costs of making developments sustainable appear to be dwarfed by the costs incurred to developers due to inflexible assessment systems discussed above.

We need an investigation into restructuring the development approval system to make it friendly to sustainable developments with actions implemented across Australia in the next year. We have run out of time!

In the current environment, sustainable development increases the cost of construction. In order to achieve a 5-star Greenstar rating, there can be as much as a 10% premium in construction costs. The water and energy savings achieved by the inclusion of sustainable technologies in a development such as on-site sewage treatment do not cover their own costs.

In economic terms, sustainable development will not be adopted by the property development industry as a whole until it becomes profitable to do so. If governments merely resort to regulation to force developers to include sustainable technologies in their developments, notwithstanding the increased costs, significant effort will be undertaken by the property industry to avoid the intended effect of the legislation rather than suffer reduced profits.

Regulation would be a feasible solution if the net cost to a development project was zero for becoming sustainable. Regulations would become unnecessary if sustainable development practices were more financially profitable than unsustainable development practices.

If government wishes to encourage the widespread adoption of sustainable development, an incentives regime will have to be adopted in order to make it profitable for property developers to carry out sustainable development.

The following mechanisms are available to government to provide financial incentives for sustainable development:

1. Set up a grant system so that taxpayers subsidise the installation of sustainable technologies;
2. Reduce taxes at all levels of government for sustainable development – the tax reductions would have to be large enough to offset the unfair increased costs of the sustainable development;
3. Fast track the development applications for sustainable developments, so as to reduce the holding costs of the project;
4. Phase out property taxes that increase the incidence of unsustainable development practices e.g. Section 94 contributions (development levies) for the non-provision of on-site car spaces. By taxing the non-provision of car spaces, local government is increasing the financial incentive for developers to construct on-site car spaces and the pollution associated with car usage;
5. Increase the permissible floor space for sustainable development; and
6. Fund for monitoring of the environmental benefits of sustainable developments

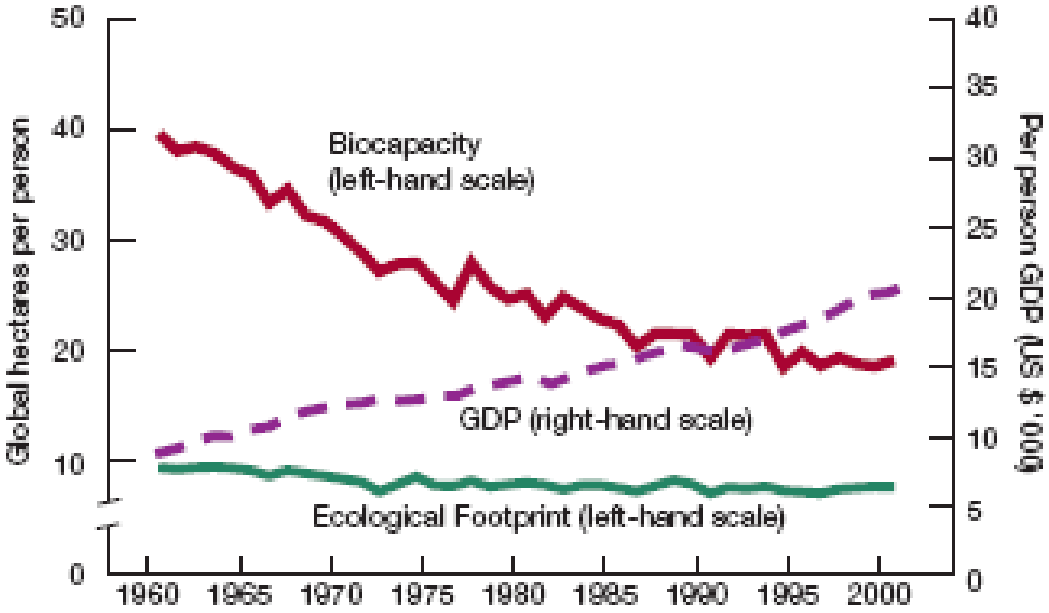
Options 3 and 5 are considered the most inexpensive for government to implement, but all measures should be implemented.

5 WHAT ABOUT THE REST OF US?

5.1 AUSTRALIANS ARE CONSUMING THE PLANET

Australia has a huge ecological footprint of about 8 global hectares per person, the highest ecological footprint per capita in the Asia Pacific region and fourth highest in the world, as shown in **Table 5-1**. Australia's ecology has shrunk due to the population growth, as shown in **Diagram 5-1** (*WWF, 2005*).

Diagram 5-1 – Graph of Australia's Ecological Footprint and Biocapacity



This ecological footprint considers resources consumed, such as, crops, animal products, fish, forest products, fossil fuels and built up areas, but not fresh water consumption.

Table 5-1 – Human Development & Ecological Footprint for Selected Countries

	Human Development Index	Ecological Footprint (gha/person)		Human Development Index	Ecological Footprint (gha/person)
Albania	0.74	1.5	Malaysia	0.79	3.0
Australia	0.94	7.7	Mongolia	0.66	3.1
Bangladesh	0.50	0.5	Morocco	0.61	0.9
Brazil	0.78	2.2	Myanmar	0.55	0.9
Cambodia	0.56	0.8	Nepal	0.50	0.6
China	0.72	1.5	New Zealand	0.92	5.5
Cuba	0.81	1.5	Nigeria	0.46	1.2
Ethiopia	0.36	0.8	Pakistan	0.50	0.7
France	0.93	5.8	Papua New Guinea	0.55	1.2
Germany	0.92	4.8	Philippines	0.75	1.2
India	0.59	0.8	South Africa	0.68	2.8
Indonesia	0.68	1.2	Sri Lanka	0.73	1.1
Italy	0.92	3.8	Sweden	0.94	7.1
Japan	0.93	4.3	Thailand	0.77	1.6
Korea, Republic	0.88	3.4	United States of America	0.94	9.5
Lao PDR	0.53	0.9	United Kingdom	0.93	5.5
Lebanon	0.75	2.2	Viet Nam	0.69	0.7
Libya	0.78	3.1			

5.2 MORE AND MORE AUSTRALIANS

The number of developments in Australia in 2001 and new development approvals in 2004/5 are illustrated in **Table 5-2**.

Table 5-2 – Developments in Australia

	Total in 2001	**Development Approvals in 2004/5**
Houses	5,753,627	106,831
Units	832471	2191
Renovations and Conversions		2177
Offices		181

Source: Australian Bureau of Statistics

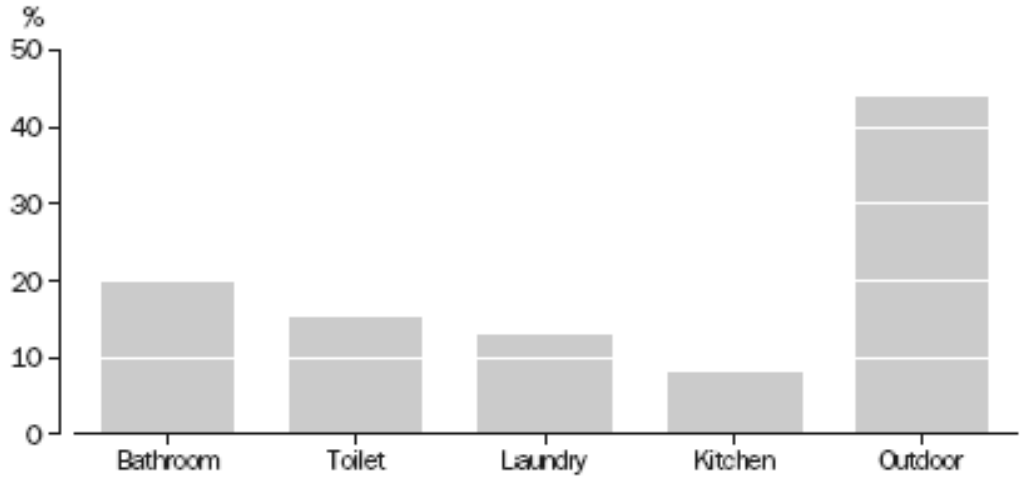
As the number of Australian households continues to grow, we need ever greater supplies of resources, including water, energy and food. As our resources or supply capacities are finite, we must make sure we can cap our consumption at some point or demand will outstrip supply.

5.3 THIRSTY AUSTRALIANS MUDDYING THE WATERS

5.3.1 Our Thirst

Most of the water used by average Australian households is outdoors, as shown in **Diagram 5-2**. Most people are using pristine drinking water to feed their gardens and flush their toilets. Around three quarters of water used in the home does not need to be drinking water!

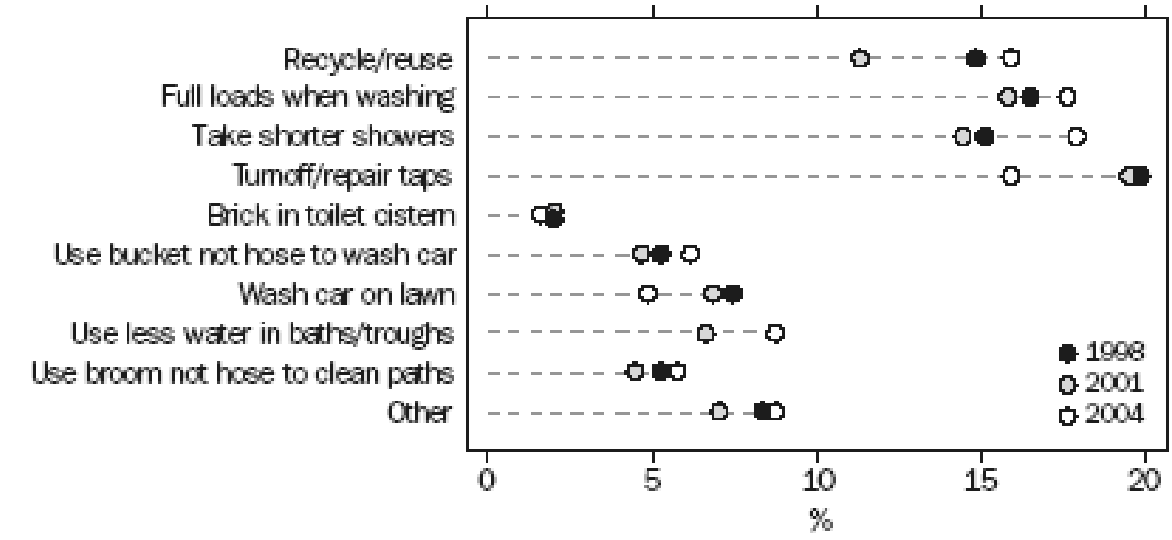
Diagram 5-2 – Location of Domestic Water Use



Source: Australian Bureau of Statistics

Fortunately, we are doing a little more to conserve our precious drinking water, as shown in **Diagram 5-3**, but does it look like enough?

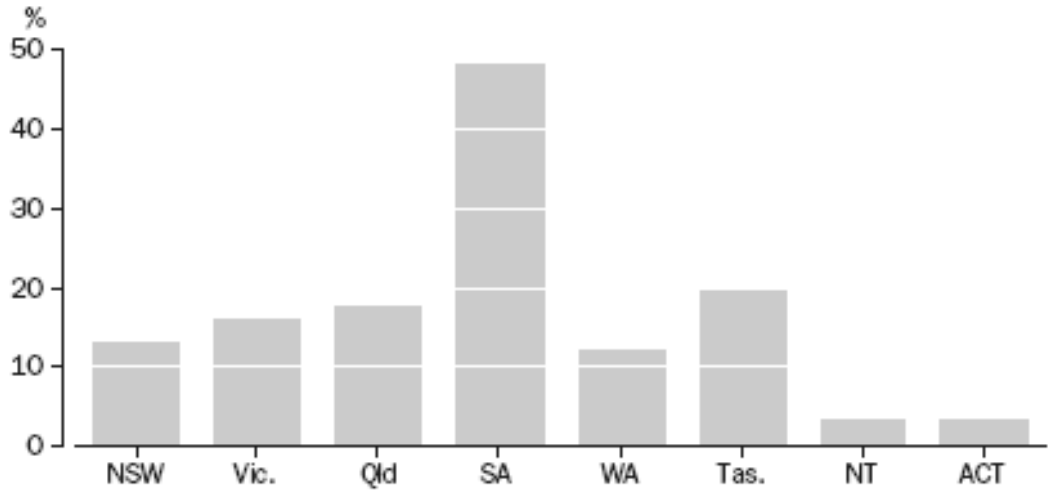
Diagram 5-3 – Water Conservation Practices Taken in Home



Source: Australian Bureau of Statistics

We can be thankful to have a roof over our heads – it means we can harvest rainwater. Thanks to rebate schemes, there has been steady increase in rainwater tank installations, with about 45,000 rebates issued per year across Australia. But as shown in **Diagram 5-4**, not many of us are taking advantage of our roofs – only18% across Australia. About 30% of households outside capital cities had rainwater tanks installed in 2004, so the number inside capital cities is even lower than 18%, although our capital cities are in areas of relatively high rainfall.

Diagram 5-4 – Proportion of Households with Rainwater Tanks, March 2004



Source: Australian Bureau of Statistics

At least we are doing a few more things to conserve water:

- About 90% of Australians use some form of water saving device;
- About 75% of homes have dual flush toilets; and
- About 40% of homes have low flow taps or showers installed.

5.3.2 Hurting Our Natural Water Systems and Causing Climate Change

The way we currently supply our drinking water and deal with our waste water has huge impacts on our natural water systems, such as:

- Loss of habitat where water supply dams are created;
- Loss of environmental flows on streams dammed for water supply; and
- Pollution of waterways with treated and untreated sewage.

We cannot turn on the tap without causing climate change, as the power to deliver tapwater and remove wastewater is supplied by coal fired power stations.

In 2002 SWC consumed approximately 400 million kWh pa of electricity, which is a major operating cost exceeding $20 million during 2002-03. The emissions and resource use associated with its generation also represent a significant portion of the Corporation's overall environmental impact.

Greenhouse gas emissions from SWC's use of energy have increased by 17% since 1998/99. This trend, which has been due to servicing population growth and increasing stakeholder and regulator requirements, is likely to continue as energy intensive operations such as water reuse and tertiary waste water treatment are implemented.

Source: http://www.energetics.com.au/services/case_studies/energetics_saves_sydney_water_15

Sustainable water systems help overcome these problems and more:

- Rainwater harvesting reduces artificially high stormwater loads on natural water systems caused by urban development;
- Infiltration of excess recycled water restores groundwater flows reduced due to urban development;
- Water is generated at the point of end use, eliminating resources wasted for transport;
- Excess recycled water may be used to produce food crops;
- No need for energy hungry distribution and collection systems, which cause climate change.

However, the management of our water resources is failing. Less than 20% of Australia is covered by a surface water management plan and only a third is covered by a groundwater management plan (*National Water Commission, 2006*).

5.3.3 What are New Developments Required to Do about Water?

All new developments are required to comply with minimum criteria for water saving, as set by the relevant legislation in each state. These criteria are summarised as follows:

Table 5-3 – Requirements for New Developments

State/Territory	Governing Criteria
ACT	ACTHERS + FirstRate
NSW	Building Sustainability Index (BASIX)
Northern Territory	Building Code of Australia
Queensland	Building Code of Australia
South Australia	Building Code of Australia
Tasmania	Building Code of Australia
Victoria	5 Star + FirstRate
Western Australia	Building Code of Australia + AccuRate

BASIX is an online tool for calculating the energy and water efficiency of new houses and apartments. In NSW, BASIX certificate is required for planning approval for all new dwellings and renovations.. The BASIX tool takes into consideration:

- The size and orientation of houses;
- The building materials used;
- How many windows and where they are positioned in relation to the sun;
- The type of water fittings used in the kitchen and bathrooms;
- Choice of hot water system;
- Whether a rainwater tank is installed and;
- How the house will be kept warm and cool.

The BASIX tool assesses these factors and provides a numerical score, in terms of percentage reduction from the current average. A minimum score for energy and water efficiency is required before the BASIX certificate may be issued. On the NSW east coast, a 40% reduction in water use is required, less is required going west across the state.

Victoria's sustainable initiative program is called 5 Star. It assesses the same criteria as BASIX and provides a score. The program requires a score of five stars for building permit approval in Victoria, which is assessed by the FirstRate software package. The 5 Star program stipulates that a new home must have a water tank supplying water either to all toilet cisterns or to a solar hot water system. The program also governs plumbing regulations and involves pressure reductions that will restrict water pressure to buildings as well as flow restrictions to all shower heads and taps.

ACTHERS is the program used in the ACT, where sustainability of new houses are assessed by using FirstRate. A minimum five star performance is required to receive an Energy Efficiency Rating Statement (EER), which is required for approval of new houses and for sale of existing houses. ACTHERS does not have any policy in regards to sustainability of water.

The remaining Australian states follow the Building Code of Australia (BCA) as a guideline towards developing new sustainable houses. The BCA currently moderates only energy consumption, so several states such as Queensland, Western Australia and South Australia have added further regulations that include the requirement of a rainwater tank, dual flush toilets and the installation of AAA rated shower heads and taps. Western Australia is combining the usage of the BCA as well as AccuRate, another computer package used for assessing the sustainability of a house.

5.3.4 How Far From Sustainable Are We?

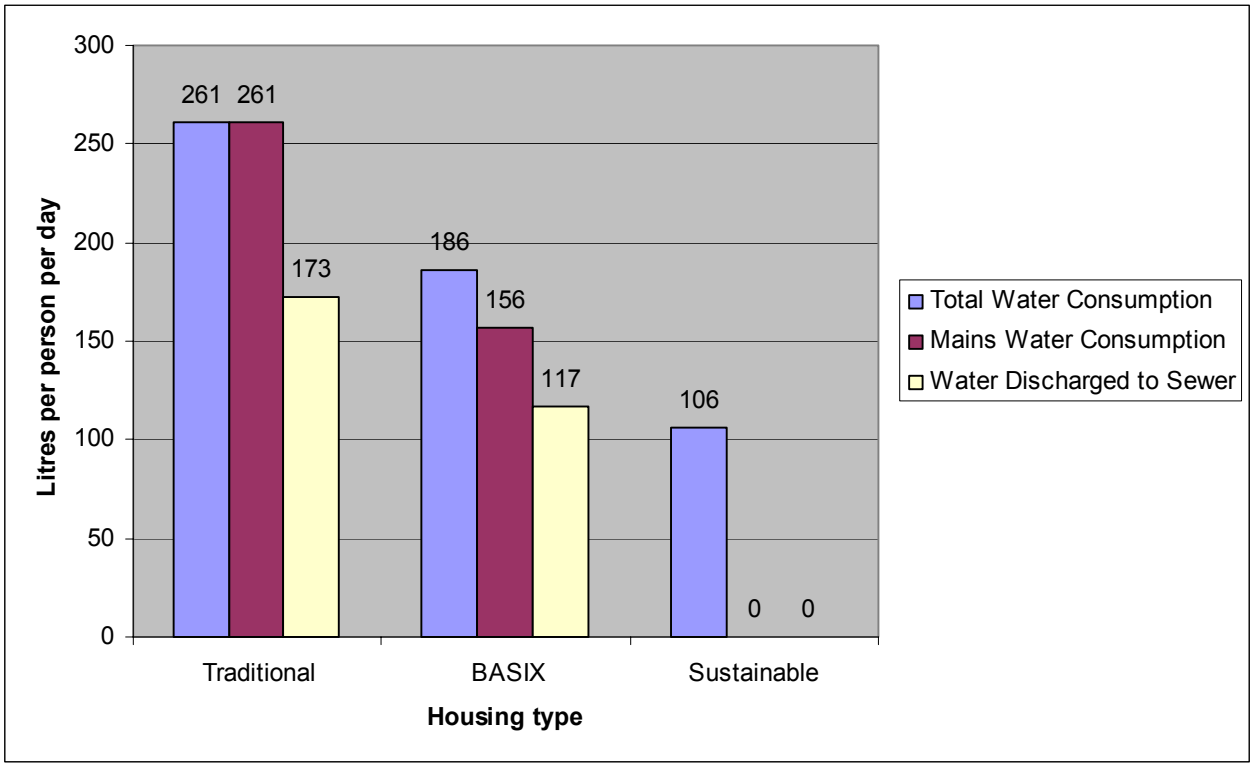
Considering that BASIX is the most demanding of the systems in place, we used it to compare different detached houses in **Diagram 5-5**:

- Traditional houses, based on data collected for BASIX for average conditions;
- Current practice houses, based on BASIX requirements (40% reduction in mains water consumption) and data collected for BASIX on water consumption breakdown data within typical houses (*to determine what rainwater would be used for to give total consumption*); and
- Sustainable houses, based on data collected in our surveys[1].

Although there is a significant reduction in water consumption with the construction of new houses under BASIX, further significant savings in mains water consumption can be achieved by sustainable houses.

[1] Data collected from the following houses: Mobbs, Campbell, Shields, Fuller and Grimshaw.

Diagram 5-5 – Water Consumption of Traditional, Current Practice and Sustainable Houses



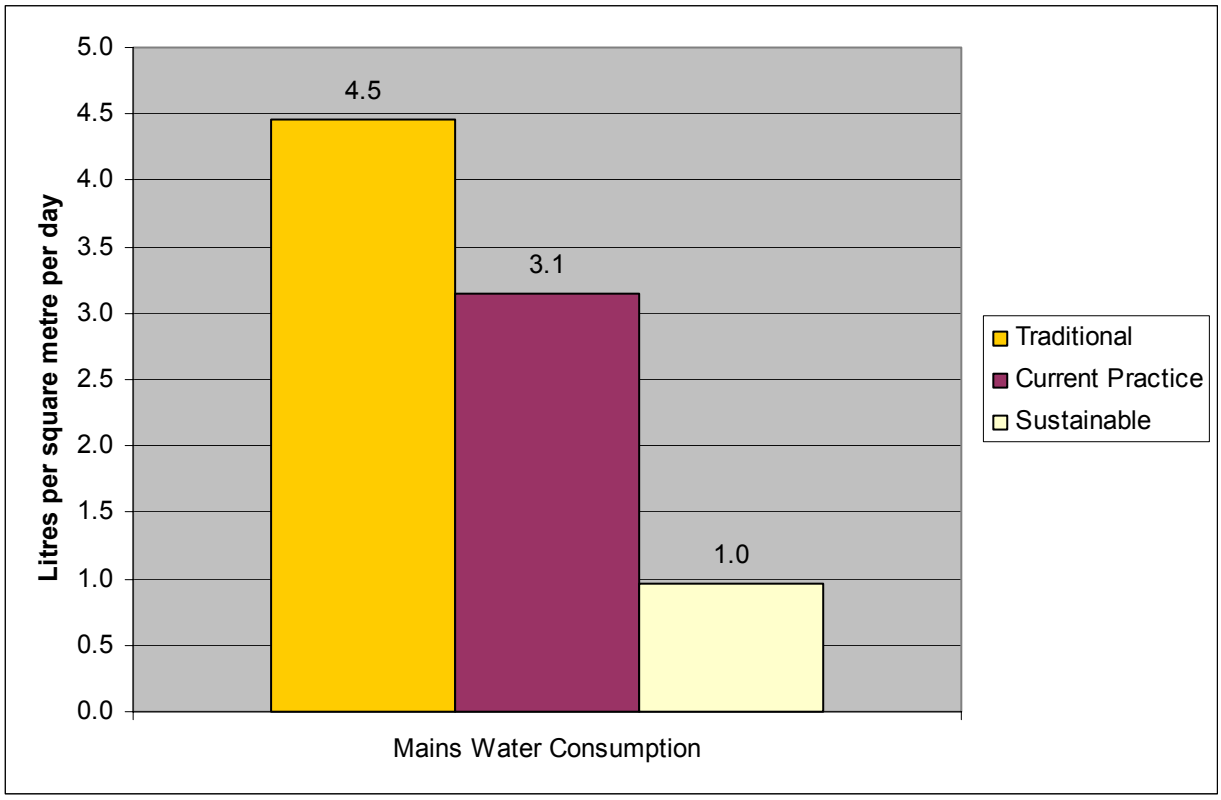
Importantly, the total water use of sustainable houses is already low, but sufficiently large rainwater tanks and recycling systems reduce the mains water required to **zero**.

Even a new house built according to the strictest BASIX requirements would consume an average 156 Litres of mains water per day. Each sustainable house saves two and a half times the mains water of such a BASIX house, with even greater savings compared to new houses in other states. The impacts this has on total mains water consumption:

- Every 1,000 sustainable houses save as much water as 2,500 BASIX houses; and
- One sustainable house saves 250,000 litres of mains water per annum, where a BASIX house only saves 100,000 litres per annum.

We also compared our data on sustainable offices with the norm using the National Australian Built Environment Rating System (NABERS), which is not compulsory, unlike BASIX. The NABERS ratings awards 2.5 stars to "current market average performance". A new sustainable office building would have a rating of 5. We assume that a traditional or old office building would have a low star rating of 1 for the sake of comparison. We took a population-weighted average for all states where data was available to determine the average mains water consumption per square metre of floor space, as shown in **Diagram 5-6**.

Diagram 5-6 – Mains Water Consumption of Traditional, Current Best Practice and Sustainable Office Buildings



Although monitoring is limited, the available data collected as part of this research shows that sustainable developments are capable of meeting the 5 star consumption rates. This research needs to continue to investigate the potential for further reductions in water use. Design information for recently completed projects indicates some **sustainable offices may be capable of achieving zero mains water consumption.**

If we enable sustainable developments, the water saving which could be achieved across Australia is significant.

Using the development data in **Table 5-2** and the mains water consumption data presented in **Diagram 5-5**, we can estimate the total water usage of all Australian houses in three scenarios:

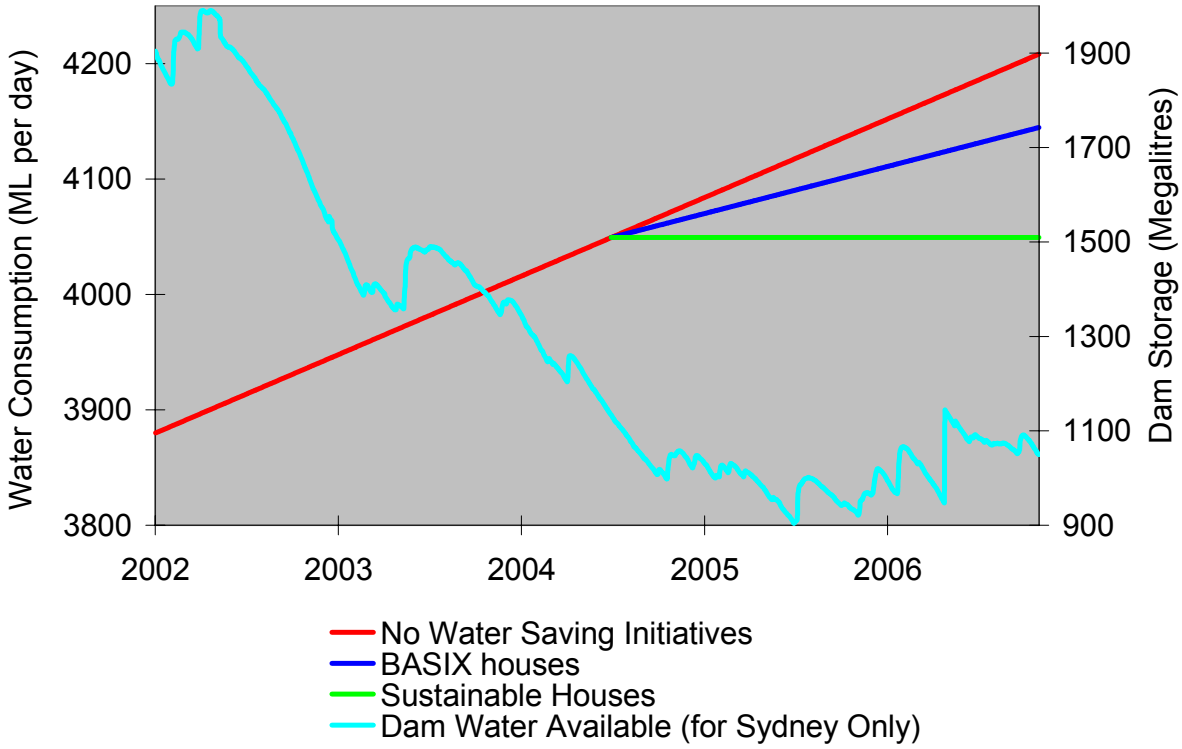
- No water savings initiatives (*without BASIX or other programs*)
- Water savings initiatives are implemented (*assuming BASIX applies to all new development, including non-NSW development*); and
- All new houses are built as sustainable houses.

These scenarios are shown in **Diagram 5-7**. No demand reduction measures such as water restrictions were taken into account in the generation of the graph. It was assumed that the demand of existing and new households would remain constant over time. BASIX was phased in, but for simplicity it is assumed that the full requirements applied from 2004.

The dam storage data was obtained for Sydney only, but is representative of the picture across almost all of Australia.

It is assumed that the average occupancy rate is 2.6 persons per house.

Diagram 5-7 –Water Consumption of Australian Houses and Dam Water Levels



Dam water level source: Sydney Water Corporation

This graph is not a prediction of future conditions, but shows the last five years, as water consumption continues to rise, but available dam water continues to fall.

If climate change reduces long term rainfall, our existing water supply systems will not be able to meet our ever increasing water demand.

Sustainable developments offer the only viable solution to cap water demands and even reduce the total demand, if renovations were required to convert existing houses to sustainable houses.

Significant reductions in existing demand need to come from existing urban development. Rainwater tanks and water saving devices help a little. A bold decision needs to be made to recycle treated effluent from inland sewage treatment works to shandy drinking water dams.

5.4 POWERING UP THE GREENHOUSE

Australian states have introduced building standards in an attempt to lower Australia's energy consumption and improve the sustainability of all new houses, but are we doing enough?

5.4.1 What are New Developments Required to Do about Energy?

The requirements for new developments are governed as set out in **Table 5-3** and Section **5.3.3**.

The BASIX assessment requires a 40% reduction in energy use.

The BCA covers requirements for:

- Roof and wall insulation;
- Eaves and other shading;
- Glazing and high performance windows and;
- Natural ventilation.

5.4.2 Are We Electrocuting our Environment?

The majority of energy used in Australian homes and offices is from non-renewable sources such as coal-fired power plants and natural gas. Burning these fossil fuels produces greenhouse and toxic gases.

Sustainable generation of energy can minimise or avoid these negative impacts, eg solar electricity generation.

5.4.3 Smart Houses not Power Houses

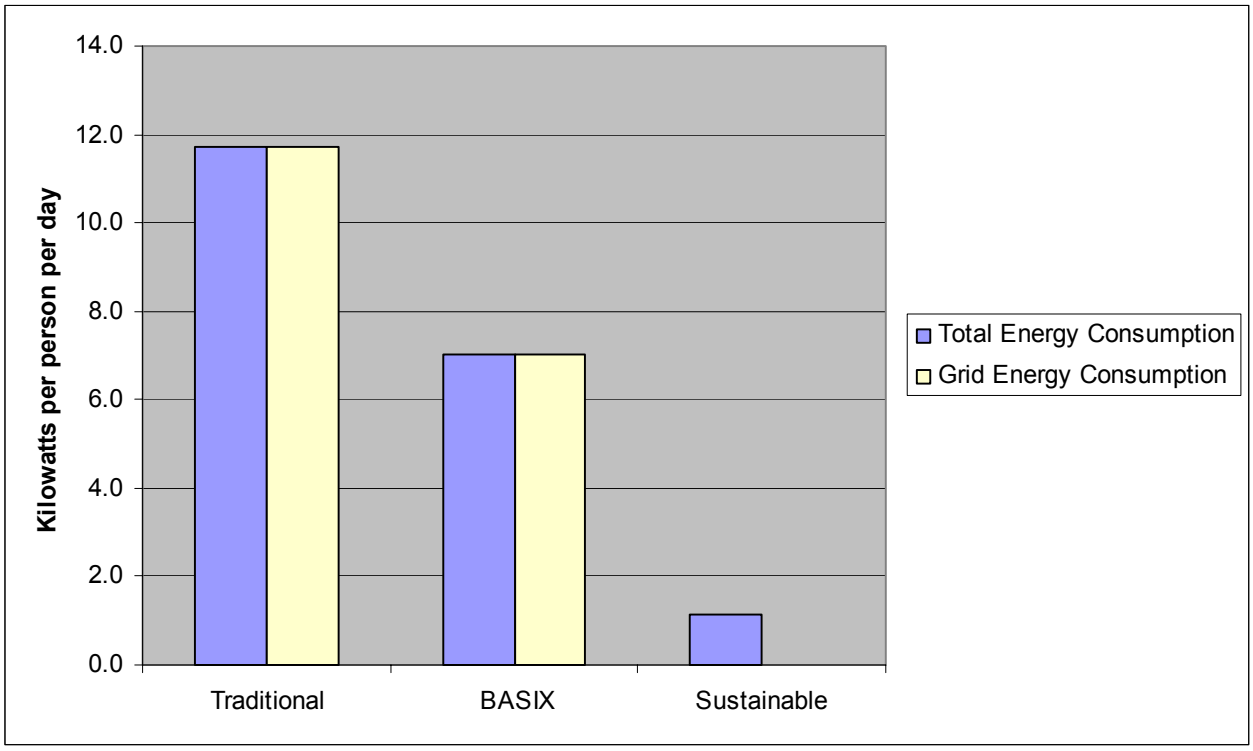
We compared power usage in different detached houses (with the results presented in **Diagram 5-8**) for:

- Traditional houses, based on Sydney consumption rates (*Energy Australia, 2005*);
- Current practice houses, based on BASIX requirements (*40% reduction in grid energy consumption*); and
- Sustainable houses, based on our surveyed data[2].

The current practice adopting the BASIX requirements shows energy consumption reduction with the implementation of energy saving devices compared to traditional houses. There is a small difference between total and grid energy consumption, as a small proportion of households have solar panels installed.

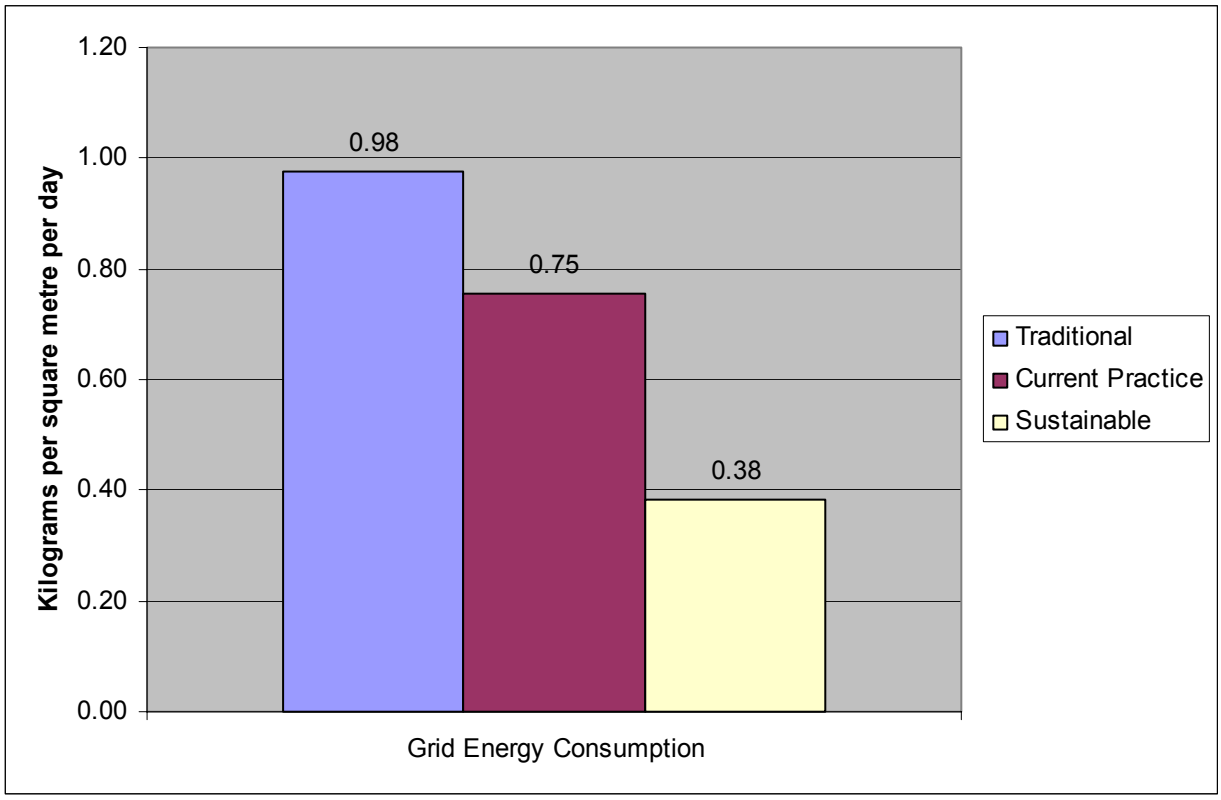
[2] Data collected from houses: Mobbs, McQuire, Miller

Diagram 5-8 – Energy Consumption of Traditional, Current Practice and Sustainable Houses



We also compared our data on sustainable offices with the norm using the National Australian Built Environment Rating System (NABERS), which is not compulsory, unlike BASIX. The NABERS ratings awards 2.5 stars to "current market average performance". A new sustainable office building would have a rating of 5. We assume that a traditional or old office building would have a low star rating of 1 for the sake of comparison. We took a population-weighted average for all states where data was available. The energy consumption, in terms of greenhouse gas production per square metre of floor area per day, is shown in **Diagram 5-9**. If we reduce energy consumption, we also reduce greenhouse gas emissions.

Diagram 5-9 – Energy Consumption of Traditional, Current Best Practice and Sustainable Office Buildings



Recently published data (*National Electricity Market Management Company, 2006*), predicts that the energy supply will fall below reliable levels in:

- the summer of 2009/10 in Queensland
- the summer of 2010/11 in New South Wales;
- the summer of 2008/09 in Victoria;
- the summer of 2007/08 in South Australia; and
- beyond the outlook period of 2015/16 in Tasmania.

But our energy consumption continues to grow! Using the development data in **Table 5-2** and the energy consumption data presented in **Diagram 5-8**, we can estimate the total energy usage of all Australian houses in three scenarios (*assuming all Australians consume at a similar rate to Sydneysiders*):

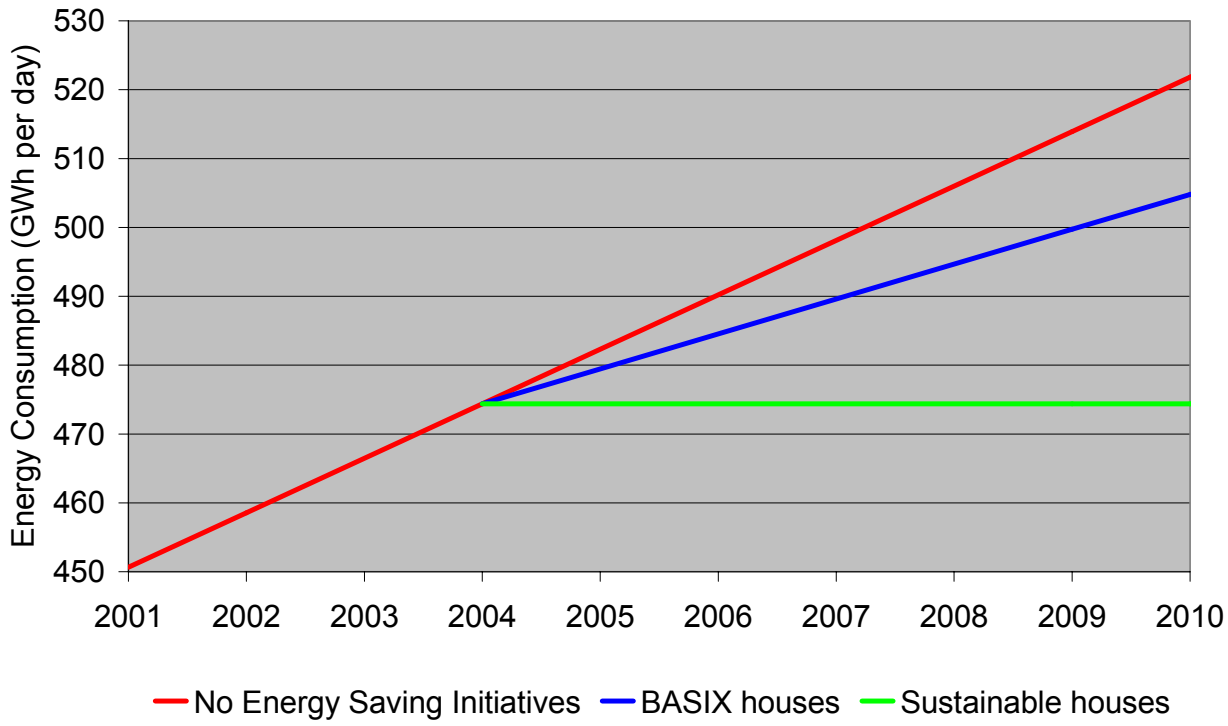
- No energy savings initiatives (without BASIX or other measures)
- Energy savings initiatives are implemented as required by BASIX; and
- All new houses are built as sustainable houses.

No demand reduction measures were taken into account in the generation of the graph. It was assumed that the demand of existing and new households would remain constant over

time. BASIX was phased in from 2004, but for simplicity it is assumed that the highest energy saving requirements applied from then.

It is assumed that the average occupancy rate is 2.6 persons per house.

Diagram 5-10 – Energy Consumption of Australian Houses



Sustainable developments offer the only viable solution to cap energy demands and even reduce the total demand, if renovations were required to convert existing houses to sustainable houses.

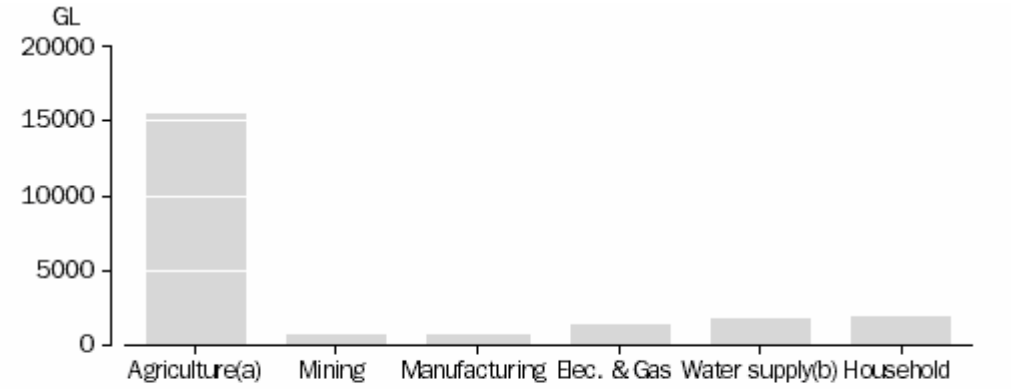
5.5 WE NEED FOOD HERE, NOW

Current food production practices use bulk distribution and retail networks. This means that raw food products travel long distances to bulk markets before finally being distributed to the point of sale to the consumer and then to the home or workplace. The energy and other resources used for these processes are difficult to estimate, but would be significant. Furthermore, this energy use produces greenhouse gases from non-renewable resources. There is also considerable wastage in retailing, where food spoilage is commonplace.

Bulk food production is also the major consumer of Australia's water, as illustrated in **Diagram 5-11**.

Sustainable developments use excess water generated on site to support the production of food, avoiding the waste of resources in transport.

Diagram 5-11 – Net Water Consumption By Sector 1996 – 97



(a) Includes services to agriculture; hunting and trapping.
(b) Includes sewerage and drainage services.
Source: ABS: 4613.0 - Australia's Environment: Issues and Trends, 2003

5.5.1 Grow Your Own Eden

Sustainable developments offer the opportunity to produce food locally, using land and water that may otherwise be wasted. Some of Australia's most valuable agricultural land has been sacrificed to urban development. We can use local food production in these areas using public and private open space to minimise this impact.

There needs to be emphasis on local food production especially on residential lots and subdivisions. **The concept of edible landscapes should be the basis for design of all subdivisions and landscaping of urban open space areas.**

Notably, food production is not considered in any of the sustainability evaluation tools, such as BASIX.

5.6 BUILDING HOUSES OR SMOG?

Current dwelling construction processes involve tradespersons travelling daily to the construction site for the duration of the construction period. If we assume that the average tradesperson travels 20 kilometres a day and 3 tradespeople are required each day, one delivery of materials is made per day, one pick up of waste is made per fortnight and the average house takes 22 weeks to construct, we can show that the vehicle transport required for a typical house would be in the order of:

- 7,000 km for tradespeople;
- 2,000 km for delivery of materials to the site; and
- 1,000 km for waste removals.

Thus, even if a house obtains high ratings under BASIX or First Rate or a current 'sustainability' rating tool, the transport energy required to build a typical house over a five month construction period exceeds 10,000 kilometres or 2.7 tonnes of greenhouse gases.

There are many opportunities that sustainable developments can capitalise on, for example, pre-fabrication of elements required for construction. Prefabrication would significantly reduce the exhaustive transport requirements of the typical housing construction. Furthermore, fabrication in a factory provides a safer, more weather-proof environment than a construction site, which would improve the health and safety of workers employed in the construction industry. Social benefits would also include reduced travel commitments to commute to a factory as opposed to a building site, which would lead to an increase in time available for workers to spend with their families or in recreation. Notably, tradespeople are amongst those with the longest commute times.

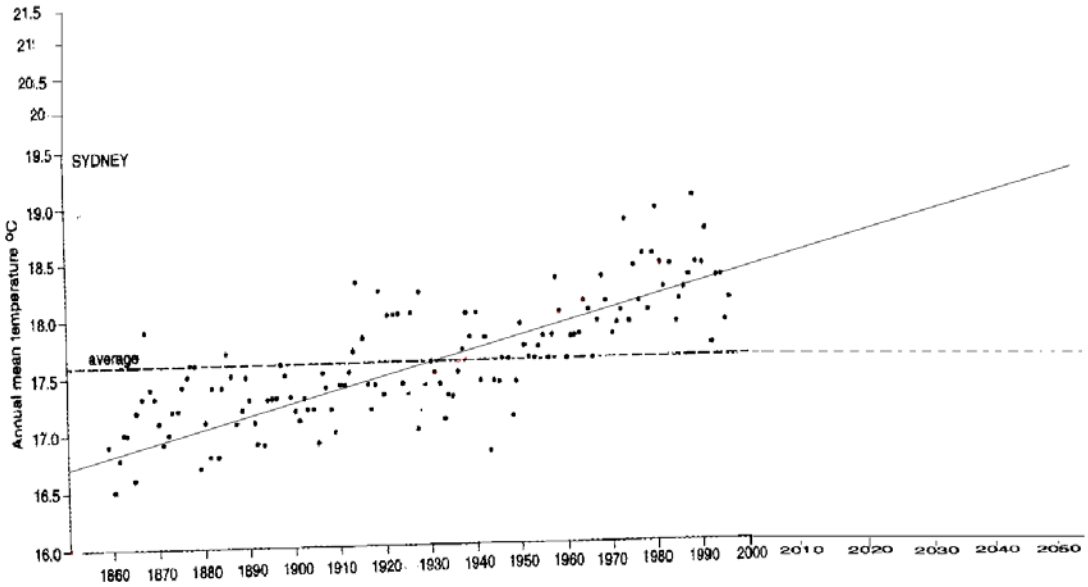
Improvements in sustainability through improved construction processes are not included in the ratings systems currently available.

5.7 ITS GETTING HOT IN HERE

Much of the climate-changing impacts are enabled by government development agencies and local councils. We are building the black and treeless roads which, along with the dark (currently fashionable) roofs or walls of buildings, are locally increasing the effects of global climate change (due to atmospheric changes - the greenhouse effect).

A clear warming trend of about 1 degree per century has been observed in Sydney, Australia as shown in **Diagram 5-12**. This suggests that during the last century, in downtown Sydney, the rapid growth of the city around the climate station causing urban heating is multiplying the effects of regional/global climate warming.

Diagram 5-12 – Sydney's Temperature on the Rise

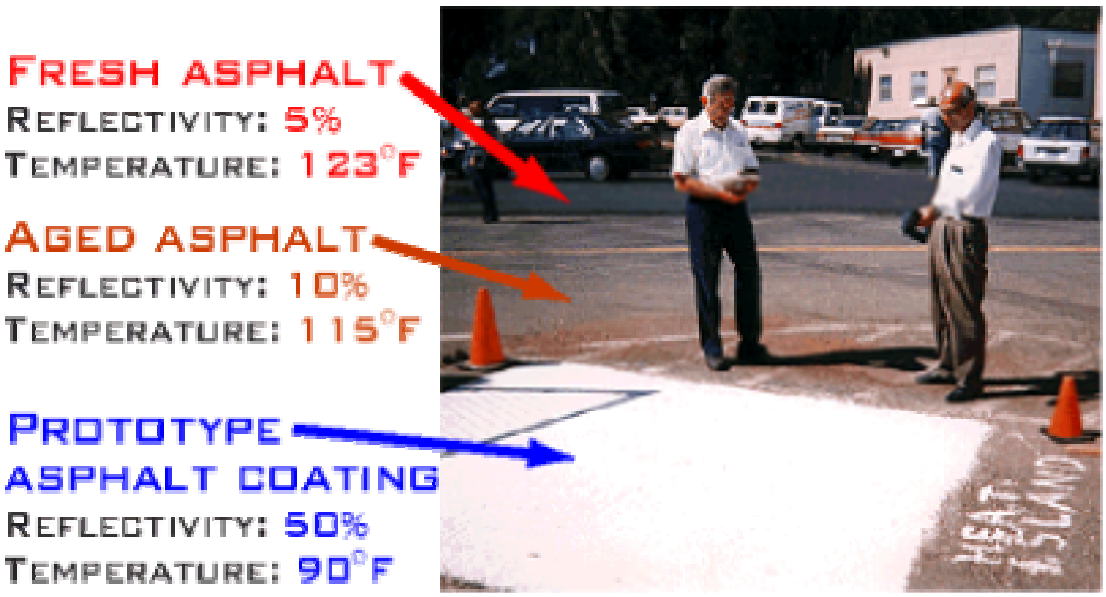


Source: E. Linacre and B. Geerts 1998

Why are Australian cities getting so hot?

Australian cities and town are hotter than they need to be because they heat up the local air temperature. Here's how:

- wide black roads heat up during our long sunny days and the heat from the roads increases the usual temperature
- dark coloured roofs heat up the air around houses and buildings
- cutting down trees removes free air conditioning by trees which shade roads, evaporate and cool air around the tree.



We can reduce urban temperatures by using light coloured, narrow roads (5.5m compared to > 7m typical), pleaching (interlocking) tree canopy over the roads, productive and edible landscapes on both private and common property and light roofs.

For an example of a suburb 3 to 6 degrees cooler than its neighbours and which has stayed that way for over 30 years because the roads are narrower and covered by trees there is no better example than Village Homes, Davis, California where some 800 people live in 242 houses (http://www.villagehomesdavis.org/). Houses in Village Homes are the most sought after, highest and fastest selling in Davis. The streets are lined with productive edible fruit trees and the village grows over 24% of its food on site.

5.8 IN SUMMARY

The comparison in **Table 5-4**, clearly shows the vast improvement in sustainability offered by sustainable houses: about half the greenhouse gases and no mains water consumption or wastewater discharge from the site.

Table 5-4 – Comparison of Sustainable and Typical Subdivisions

Sustainable Subdivision: Magpie Sustainable Village, NSW	**Typical New Subdivision**
Number of Lots	
64	64
Type of Houses	
Sustainable *2.6 people per house*	*BASIX compliant* *2.6 people per house*
Number of Cars	
1 per house	*1.5 per house*
1 car share car for all 64 houses	
= 1.15 tonnes CO_2-e per person per year	**= 2.15 tonnes CO_2-e per person per year**
Electricity Consumption	
Solar energy system for each house, plus cogeneration.	*40% reduction*
= 0.3 tonnes CO_2-e per person per year	**= 1.9 tonnes CO_2-e per person per year**
Mains Water Consumption	
Self sufficiency	*40% reduction*
= 0 Litres per person per year	**= 57 kilolitres per person per year**
Wastewater Production	
All wastewater treated onsite	*No wastewater treated onsite*
= 0 Litres per person per year	**= 43 kilolitres per person per year**
Food Production	
25% of food grown on subdivision	*No food grown on subdivision*
= 2 tonnes CO_2-e per person per year	**= 2.6 tonnes CO_2-e per person per year**
Local Air Temperature Change	
Minimal change	**3-6 °C warmer**
Ecological Footprint	
3.9 global hectares per person	8.1 global hectares per person
Total Annual Greenhouse Emissions	
3.4 tonnes per person	**6.6 tonnes per person**
Total Annual Subdivision Greenhouse Emissions	
575 tonnes	**1107 tonnes**

Qualifications for calculations are attached as **Appendix D**.

6 WHAT NEEDS TO HAPPEN NOW?

6.1 ENABLE SUSTAINABILITY

We have demonstrated that many ordinary Australians have achieved sustainability in renovating or building their homes and offices. These Australians have done so without any significant support from government, even though what they are doing is in the interests of all Australians. In fact, rules and regulations hindered these Australians.

It's time for government to enable sustainability.

The current systems for assessing and approving developments need revision. We must promote sustainable developments and stop hindering their implementation. We should use incentives, such as:

- Reduced requirements for utility service provision compared to standard developments;
- Reduced requirements for monetary contributions; and
- An expedited approvals process.

The following mechanisms are available to Government to provide financial incentives for sustainable development:

1. Set up a grant system so that taxpayers subsidise the installation of sustainable technologies;
2. Reduce taxes at all levels of government for sustainable development – the tax reductions would have to be large enough to offset unfair increased costs of the sustainable development;
3. Fast track the development applications for sustainable developments, so as to reduce the holding costs of the project;
4. Phase out property taxes that increase the incidence of unsustainable development practices e.g. Section 94 contributions (development levies) for the non-provision of on-site car spaces. By taxing the non-provision of car spaces, local government is increasing the financial incentive for developers to construct on-site car spaces and the pollution associated with car usage;
5. Increase the permissible floor space for sustainable development;
6. Funding for monitoring of the environmental benefits of sustainable developments

Options 3 and 5 are considered the most inexpensive for government to implement, however all incentives should be implemented.

6.2 SUSTAINABILITY RATING TOOLS

The sustainability rating tools such as BASIX, First Rate etc. need to have the flexibility to consider the full range of sustainable activities for water, energy, transport and food as well as promote full sustainability. The tools need to be more transparent and available.

6.3 GREENSTAR IS THE WRONG TOOL IN THE WRONG PLACE

For the Knox Place commercial building at Double Bay, the Greenstar rating program was inadequate in three fundamental ways *(Michael Mobbs)*.

Firstly, it creates another cost and time barrier to the achievement of sustainable buildings. It is almost impossible to obtain a rating for a small office building (around 200 people) for less than $80,000 – $100,000, and the time required is several weeks of consultants' time;

Secondly, the process raises serious issues of potential conflict of interest, breaches of intellectual property and self-interest. The program requires and awards points only when nominated consultants are used, only when computer programs are used (which are expensive to buy and maintain). No benchmark data has been published on how points are awarded or may be obtained for key areas of innovation. The areas of innovation are assessed without accountability by the owners or users of computer programs, which use unpublished and unverifiable assumptions.

The solution to these first two problems is for Greenstar to be operated by an independent government agency or program that is 'free to air' such as the web based BASIX program.

Thirdly, the process does not provide for the fully sustainable project, in particular:

- it gives no points for providing no car spaces, and allows too many credit points for too many cars. Thus, there are only two sustainable office buildings without car parking so far built during the operation of the Greenstar program;
- it makes no allowance for the imposition of property taxes by local government where many councils will either refuse a project if no car spaces are provided, or require developer contributions for the provision of onsite car spaces;
- it gives no points for not using mains water or sewage; and
- it does not distinguish between single owner buildings and tenanted offices. Tenanted offices are much more difficult to make sustainable as the needs of tenants have to be taken into account. For example, it is particularly difficult to achieve passive air design as tenants are not obliged to open the windows and doors to ventilate both them and their fellow tenants.

7 OTHER RESEARCH

Aussies Sustaining Australia considers it essential that urgent research begin this year to produce by 2007:

- Benchmark data about sustainable projects and energy, water, food and land use which may be freely accessed by governments, developers and citizens to make it easier, quicker and more profitable to develop sustainably;
- Simple, easily-implemented reforms to red tape and state and federal development approval processes to make it quicker and more certain to develop sustainably.

The data, research and reforms need to be capable of immediate implementation in our suburbs and countrysides, and must not increase the cost of development for sustainable projects.

Three 'snapshots' of our cities and countrysides are extracted in the next three sections below. They show current research and approaches by the three universities with which Aussies Sustaining Australia has entered into Memoranda of Understanding to carry on our research (a copy of the proposals to Aussies Sustaining Australia is in **Appendix C**).

7.1 TREE WATER USE, DROUGHT AND CATCHMENT WATER YIELD

Prof Derek Eamus and his team in the University of Technology have studied how climate change, land use practices and fire will impact on the amount of water available for us to use. The following gives an example of a study on the Liverpool Plains of NSW that provides some answers.

That Australia is the driest of all inhabited continents is well known. Average annual rainfall for the entire continent is 400 – 500 mm, but can range between 310 and 800 mm over the course of several decades. Thus, Australia is not only the driest of continents but also has the most variable climate. Understanding how this variability impacts on the amount of water available for human activities such as drinking, irrigation and other commercial use, but also how much is available to maintain ecosystem function (such as river flows and wetland health), is of vital concern to water and land managers. The amount of water entering aquifers as recharge is also of particular concern, given the increasing reliance we are placing on groundwater reserves.

In 2002 and 2003 we investigated water use of woodlands on the Liverpool Plains, an agriculturally productive area in NSW, producing wheat, sorghum and sunflowers. In the first year of study, drought hit the area and rainfall was 370 mm, or 61 % of the long-term mean. In 2003, rainfall was 521 mm, or 86 % of the long-term mean (Fig. 1). How did tree water use response respond?

Water use of the stand of trees was a larger proportion of the annual total rainfall (87%) during the drought period, than during the post-drought period (50%) when rainfall was higher (Table 1). Because of this, groundwater recharge was likely to be higher in the second year compared to the first year. This recharge is important for replenishing water levels in the aquifer. In the absence of

begin to dry up in the dry season. However, it is also true that removing too many trees from landscapes significantly increases recharge and when this recharge is increased for many decades, groundwater tables rise, with the potential for salts to migrate towards the soil surface and dryland salinity can become a problem. The Liverpool Plains suffers from significant dryland salinity problems. Consequently, understanding how trees use water when rainfall input changes will assist us in managing water resources in agricultural and forested landscapes. For example, it should be remembered that Melbourne receives most of its water as run-off from forested catchments. If these forests increase their water use because of climate change, the water yield will decrease and water availability to Melbourne will decline.

Plate 1: Tree sensor to monitor water use

Table 1. A comparison of stand water use during the drought and higher rainfall periods.

	6 months of drought (Dec 02 to May 03)	**6 months post-drought (Dec 03 to May 04)**
Rain (mm)	174	545
Tree water use (mm)	151	273
Percent of rainfall used by trees	87%	50%

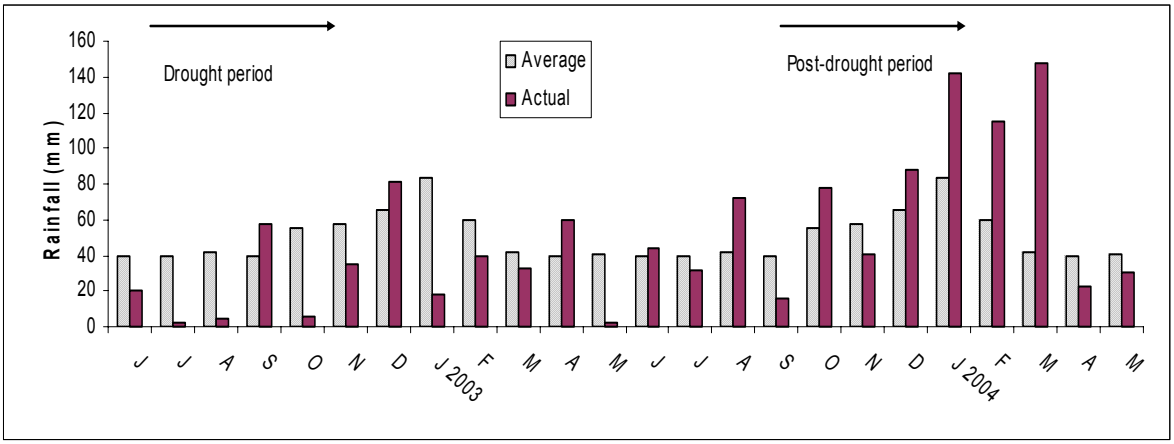


Figure 1. Rainfall over the past 2 years, compared with 50 year average rainfall (Source: BOM).

7.2 SUBURBIA: THE NEW FARMING FRONTIER?

Brendan Gleeson of Griffith University and Bill Randolph of University of NSW have described how Australians used to grow much of their food where they lived in their cities, and have given examples of ways we can once again grow food where we live.

Climate change and prolonged drought are putting pressure on Australia's rural food bowls. Many of the food bowls are a long way from our metropolitan areas, having been pushed away by suburban growth. The food that ends up on our tables – even our home-grown produce – has usually travelled significant distances. And 'food miles' continue to grow.

There is rising awareness of the financial and greenhouse emissions costs of lengthening food miles. This is reinforced by a growing sense that cities should assume more responsibility for the production of their resource needs – including food, water and energy – and for disposing of their wastes. Cities that assume this responsibility will be less prone to the risks arising from disturbances to resource supply systems, including droughts and other extreme weather events.

There's nothing radical or especially new about this idea. Our grandparents recall a time when Australia's cities were major centres of food production, when the suburbs especially were farmscapes as much as dormitories. Research by the leading historian Patrick Mullins confirms that up until the Second World War, household production of foodstuffs was a major proportion of total national production. Mullins shows, for example, that in 1950 households accounted for nearly half of the nation's egg production.

His fellow historian, Grace Karksens, reminds us that in 1920s Sydney "the backyard was a vital source of food. Most people had large vegetable gardens and ran chooks". In his autobiographical novel, *Johnno*, David Malouf describes his pre-war Brisbane home as "a suburban farmlet, with rows of spinach, tomatoes, lettuce, egg-plants, a shed where onions and garlic hung from rafters, and a wired coop full of chooks".

In the past few decades the suburban farmscape has yielded to other backyard pursuits and

installations. Also, the entry of women into the workforce, and the rise of busy work routines and lifestyles, has made it harder for households to tend gardens and mind animals. The sustainability challenge seems to be pointing clearly to the need to restore the food productive capacities of our suburbs and inner cities. How do we do this without turning the clock back?

It's not as hard as we might imagine, but imaginative solutions are needed. One small example is the group of families in suburban Brisbane who allow a bee keeper to maintain native bee hives in their backyards. The bees love the attractive native grasses the families have been encouraged to plant. And native bees don't sting people. The keeper makes non intrusive visits and the families get to keep some of the honey. Everyone wins, and nobody has to stay home and mind the farm!

Sustainability innovators are already restoring the food productive capacities of our cities. We need to learn from them, extend their practices and ensure that institutions enable their work.

7.3 WATER CONSUMPTION AND THE BUILT ENVIRONMENT: A SOCIAL AND BEHAVIOURAL ANALYSIS

The third university which wishes to take over the research initiated by Aussies Sustaining Australia, University of New South Wales, has studied urban water use and an example of their recent work shows that many water users are unaware of the price of water, which suggests water costs are either too cheap to be noticed, or, worse still, that so called pricing 'reforms' over the last ten years have never amounted to much in the pubic mind.

Authors: Emeritus Professor Patrick Troy and Professor Bill Randolph. Published by the City Futures Research Centre. Research Paper No. 5, June 2006, Faculty of the Built Environment, University of New South Wales.

How and why Sydneysiders use domestic water the way they do is the subject of a new report that reveals the impact of water restrictions, and whether we can expect to save more in future. A poll of 2179 households taken between December 2004 and May 2005 shows that nearly nine out of ten respondents (87%) took one or more steps to save water in the previous 12 months.

Behaviours that have changed most dramatically were those targeted by restrictions, such as car washing, and the watering of lawns and gardens, and those achieved with little extra effort, such as taking shorter showers and turning off taps while brushing teeth.

A clear majority of respondents (75%) said they had changed the way they used water *inside the home* since water restrictions had been in force. There was a clear differential between respondents in houses and those in higher density housing. While 79% of those in houses and 75% of those in semi-detached homes had changed their internal water use patterns, only 67% of respondent living in a low rise flat said they had. The proportion fell to 58% for high-rise flat dwellers. So the level of inaction on *internal* water conservation doubled from one in five for houses to two in five for high-rise flats.

People's water use is associated with their income, the type of dwelling they live in, and whether they have facilities like a garden, lawn, car, swimming pool and extra bathrooms and toilets. These factors mean that future policies for saving water need to be tailored to people's incomes and housing types.

Respondents were asked what they had done to reduce water use in previous year, and their intentions

to save water in the following 12 months. The most common actions to reduce water use were reduced garden watering (37%), taking shorter showers (18%), and washing vehicles less frequently (29%). These percentages are for people with gardens, showers and vehicles. But overall, while one quarter of all people surveyed said they never watered the garden (24%), another quarter (25%) admitted to watering the garden three or four times a week or more, in breach of water restrictions. A small hard core of respondents (4%) haven't responded to calls to water less frequently.

Overall, 13% reported no action to reduce water use in the previous year, ranging from 6% for respondents living in houses, 10% for those in semis and as many as 20% of flat dwellers. Flat dwellers seem to be less willing or able to further respond to the need to reduce water consumption.

Only one in four households said they thought they could do more to reduce future water use – 7% thought they could do a lot more, while just 18% thought they could do a little more. Nearly one third (31%) said they thought there was nothing more they could do to save water and a further 44% would only do a little.

These results suggest that further domestic water savings may be limited by prevailing attitudes and patterns of behaviour. Interestingly, there was no significant difference in the proportions answering this question between those living in houses, semi-detached houses or flats, both high and low rise.

The most likely water conservation behaviour in the immediate future is increasingly focusing on a range of activities *inside* the home especially in the way households use their kitchen, bathroom and washing appliances. This is where the next major change in water use behaviour could be focused.

Perhaps most worrying for those arguing that water pricing is an effective conservation policy was that only one in five people (19%) said they knew how much water they used in the last quarter. Among focus group participants, few had any idea how much water cost or how much they used. The price of water was considered largely irrelevant to water conservation. Much more important was encouragement for consumers to change their behaviour and attitude: "carrots not sticks", were needed. In addition, while two out of five (38%) thought that they used an average amount of water compared to similar households, half (48%) guessed that they used less than an average household. Only 7% believed they used more than an average amount of water. These results are clearly unrealistic and shows that most people significantly underestimate the amount of water they use.

Three quarters of respondents (75%) agreed that an additional fee should be charged for consumers who use well above average amounts of water, while 71% thought that charges should also be discounted for those who use well below average amounts of water. But despite widespread support for differential pricing to reflect water consumption, a majority (60%) of respondents said they do not think water prices should be increased to encourage lower water use.

Overall, the results can be taken as a positive indication that Sydney residents are changing their attitudes and behaviour toward water use, with increased take up of a wide range of water conservation practices. However, Sydney residents have some way to go before attitudes to water conservation lead to widespread and substantial changes in behaviour to achieve further water reduction gains through changed practice inside the home and it is not at all clear how pricing can assis tin this without a major educational campaign on how much water actually costs.

For a copy of the report – go to: http://www.fbe.unsw.edu.au/cityfutures/

7.4 COMPILATION OF SUSTAINABLE PROJECTS LISTS

Lists have been compiled by other researchers on sustainable Australian projects. An example is found in **Appendix B**.

7.5 RE-IMAGINING THE AUSTRALIAN SUBURB

Research for this project and existing research demonstrates our suburbs and countrysides need to be used differently if our culture is to be sustained. Current city design increases the ambient temperature of our towns and cities by 3 to 6 degrees, and is doubling the impact of climate change. Climate change has made traditional farming practices obsolete.

This RMIT program includes research in ecological footprints, the uptake of sustainable building practices and an industry project which has built a sample "Ecohome" in Melbourne. Further information is available at:
http://www.cfd.rmit.edu.au/programs/sustainable_buildings/re_imagining_the_australian_suburb

7.6 URBAN AGRICULTURE NETWORK

This non-government organisation was established to "help advance global food security".

http://urbanag_nettworx.iwpp0.com/index.html

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